

[FIG.1]

GUARD PERIOD

EFFECTIVE SYMBOL PERIOD

SYMBOL PERIOD

5

[FIG.2]

GUARD PERIOD

EFFECTIVE SYMBOL PERIOD

DEVIATION

10 FFT WINDOW POSITION

FFT WINDOW POSITION

FFT WINDOW POSITION

[FIG.3]

15 MAIN WAVE IMPULSE

AFTER-GHOST IMPULSE

PRE-GHOST IMPULSE

[FIG.4]

20 100 SYNCHRONIZATION TRACKING APPARATUS

102 RADIO RECEIVING SECTION

103 REPLICA GENERATION SECTION

104 DELAY PROFILE GENERATION SECTION

105 INTEGRAL VALUE CALCULATION SECTION

25 106 MAXIMUM INTEGRAL VALUE DETECTION SECTION

107 DEMODULATION TIMING DETECTION SECTION

[FIG.5]

START

ST201 REPLICA GENERATION

ST202 DELAY PROFILE GENERATION

ST203 INTEGRAL VALUE CALCULATION FOR EACH FIXED RANGE

5 OF DELAY PROFILE

ST204 MAXIMUM INTEGRAL VALUE DETECTION

ST205 DEMODULATION TIMING DETECTION

END

10 [FIG.6]

300 SYNCHRONIZATION TRACKING APPARATUS

102 RADIO RECEIVING SECTION

103 REPLICA GENERATION SECTION

104 DELAY PROFILE GENERATION SECTION

15 301 DETECTION SECTION

302 DETECTION SECTION

303 INTERVAL CALCULATION SECTION

105 INTEGRAL VALUE CALCULATION SECTION

106 MAXIMUM INTEGRAL VALUE DETECTION SECTION

20 107 DEMODULATION TIMING DETECTION SECTION

[FIG.7]

400 SYNCHRONIZATION TRACKING APPARATUS

102-1 RADIO RECEIVING SECTION

25 102-N RADIO RECEIVING SECTION

103 REPLICA GENERATION SECTION

104-1 DELAY PROFILE GENERATION SECTION

104-N DELAY PROFILE GENERATION SECTION

401 ADDITION SECTION
 105 INTEGRAL VALUE CALCULATION SECTION
 106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
 107 DEMODULATION TIMING DETECTION SECTION

5

[FIG.8]

500 SYNCHRONIZATION TRACKING APPARATUS
 102-1 RADIO RECEIVING SECTION
 102-N RADIO RECEIVING SECTION

10 501 SELECTION SECTION
 103 REPLICA GENERATION SECTION
 104 DELAY PROFILE GENERATION SECTION
 105 INTEGRAL VALUE CALCULATION SECTION
 106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
 15 107 DEMODULATION TIMING DETECTION SECTION

[FIG.9]

600 SYNCHRONIZATION TRACKING APPARATUS
 102 RADIO RECEIVING SECTION
 20 103 REPLICA GENERATION SECTION
 610 DELAY PROFILE GENERATION SECTION
 611 CORRELATION VALUE GENERATION SECTION
 612 THINNING-OUT INTERVAL SETTING SECTION
 613 IN-PHASE ADDITION SECTION
 25 105 INTEGRAL VALUE CALCULATION SECTION
 106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
 107 DEMODULATION TIMING DETECTION SECTION

[FIG.10]

700 SYNCHRONIZATION TRACKING APPARATUS
102 RADIO RECEIVING SECTION
103 REPLICA GENERATION SECTION
5 104 DELAY PROFILE GENERATION SECTION
701 DELAY SPREAD VALUE CALCULATION SECTION
702 REFERENCE VALUE SETTING SECTION
703 DELAY SPREAD VALUE DETERMINATION SECTION
105 INTEGRAL VALUE CALCULATION SECTION
10 106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
107 DEMODULATION TIMING DETECTION SECTION
704 DETECTION SECTION
705 DETECTION SECTION
706 INTERVAL CALCULATION SECTION
15 707 INTERVAL DETERMINATION SECTION
708 THRESHOLD VALUE CHANGING SECTION
709 DEMODULATION TIMING DETECTION SECTION

[FIG.11]

20 800 SYNCHRONIZATION TRACKING APPARATUS
102 RADIO RECEIVING SECTION
103 REPLICA GENERATION SECTION
104 DELAY PROFILE GENERATION SECTION
701 DELAY SPREAD VALUE CALCULATION SECTION
25 702 REFERENCE VALUE SETTING SECTION
703 DELAY SPREAD VALUE DETERMINATION SECTION
105 INTEGRAL VALUE CALCULATION SECTION
106 MAXIMUM INTEGRAL VALUE DETECTION SECTION

107 DEMODULATION TIMING DETECTION SECTION
801 MAXIMUM PEAK VALUE DETECTION SECTION
802 DETECTION SECTION
803 DETECTION SECTION
5 804 INTERVAL CALCULATION SECTION
805 INTERVAL DETERMINATION SECTION
806 THRESHOLD VALUE CHANGING SECTION
807 NEGATIVE DIRECTION POSITION STORAGE SECTION
808 DEMODULATION TIMING DETECTION SECTION

10

[FIG.12]

900 SYNCHRONIZATION TRACKING APPARATUS
102 RADIO RECEIVING SECTION
103 REPLICA GENERATION SECTION
15 104 DELAY PROFILE GENERATION SECTION
105 INTEGRAL VALUE CALCULATION SECTION
106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
901 DETECTION SECTION
902 DETECTION SECTION
20 903 INTERVAL CALCULATION SECTION
904 INTERVAL DETERMINATION SECTION
905 THRESHOLD VALUE CHANGING SECTION
906 DEMODULATION TIMING DETECTION SECTION
910 DEMODULATION TIMING DETECTION UNIT

25

[FIG.13]

1000 SYNCHRONIZATION TRACKING APPARATUS
102-1 RADIO RECEIVING SECTION

102-N RADIO RECEIVING SECTION
103 REPLICA GENERATION SECTION
104-1 DELAY PROFILE GENERATION SECTION
104-N DELAY PROFILE GENERATION SECTION
5 1001 ADDITION SECTION
105 INTEGRAL VALUE CALCULATION SECTION
106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
901 DETECTION SECTION
902 DETECTION SECTION
10 903 INTERVAL CALCULATION SECTION
904 INTERVAL DETERMINATION SECTION
905 THRESHOLD VALUE CHANGING SECTION
906 DEMODULATION TIMING DETECTION SECTION
910 DEMODULATION TIMING DETECTION UNIT
15
[FIG.14]
1100 SYNCHRONIZATION TRACKING APPARATUS
102-1 RADIO RECEIVING SECTION
102-N RADIO RECEIVING SECTION
20 1101 SELECTION SECTION
103 REPLICA GENERATION SECTION
104 DELAY PROFILE GENERATION SECTION
105 INTEGRAL VALUE CALCULATION SECTION
106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
25 901 DETECTION SECTION
902 DETECTION SECTION
903 INTERVAL CALCULATION SECTION
904 INTERVAL DETERMINATION SECTION

905 THRESHOLD VALUE CHANGING SECTION
 906 DEMODULATION TIMING DETECTION SECTION
 910 DEMODULATION TIMING DETECTION UNIT

5 [FIG.15]

1200 SYNCHRONIZATION TRACKING APPARATUS
 102 RADIO RECEIVING SECTION
 103 REPLICA GENERATION SECTION
 1210 DELAY PROFILE GENERATION SECTION
 10 1211 CORRELATION VALUE GENERATION SECTION
 1212 THINNING-OUT INTERVAL SETTING SECTION
 1213 IN-PHASE ADDITION SECTION
 105 INTEGRAL VALUE CALCULATION SECTION
 106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
 15 901 DETECTION SECTION
 902 DETECTION SECTION
 903 INTERVAL CALCULATION SECTION
 904 INTERVAL DETERMINATION SECTION
 905 THRESHOLD VALUE CHANGING SECTION
 20 906 DEMODULATION TIMING DETECTION SECTION
 910 DEMODULATION TIMING DETECTION UNIT

[FIG.16]

1300 SYNCHRONIZATION TRACKING APPARATUS
 25 102 RADIO RECEIVING SECTION
 103 REPLICA GENERATION SECTION
 104 DELAY PROFILE GENERATION SECTION
 105 INTEGRAL VALUE CALCULATION SECTION

106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
1301 MAXIMUM PEAK VALUE DETECTION SECTION
1302 POSITIVE POSITION DETECTION SECTION
1303 NEGATIVE DIRECTION POSITION DETECTION SECTION
5 1304 INTERVAL CALCULATION SECTION
1305 INTERVAL DETERMINATION SECTION
1306 THRESHOLD VALUE CHANGING SECTION
1307 NEGATIVE DIRECTION POSITION STORAGE SECTION
1308 DEMODULATION TIMING DETECTION SECTION
10 1310 (DEMODULATION TIMING DETECTION UNIT)

[FIG.17]

1400 SYNCHRONIZATION TRACKING APPARATUS
102-1 RADIO RECEIVING SECTION
15 102-N RADIO RECEIVING SECTION
103 REPLICA GENERATION SECTION
104-1 DELAY PROFILE GENERATION SECTION
104-N DELAY PROFILE GENERATION SECTION
1401 ADDITION SECTION
20 105 INTEGRAL VALUE CALCULATION SECTION
106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
1301 MAXIMUM PEAK VALUE DETECTION SECTION
1302 POSITIVE DIRECTION POSITION DETECTION SECTION
1303 NEGATIVE DIRECTION POSITION DETECTION SECTION
25 1304 INTERVAL CALCULATION SECTION
1305 INTERVAL DETERMINATION SECTION
1306 THRESHOLD VALUE CHANGING SECTION
1307 NEGATIVE DIRECTION POSITION STORAGE SECTION

1308 DEMODULATION TIMING DETECTION SECTION
1310 (DEMODULATION TIMING DETECTION UNIT)

[FIG.18]

5 1500 SYNCHRONIZATION TRACKING APPARATUS
102-1 RADIO RECEIVING SECTION
102-N RADIO RECEIVING SECTION
1501 SELECTION SECTION
103 REPLICA GENERATION SECTION
10 104 DELAY PROFILE GENERATION SECTION
1401 ADDITION SECTION
105 INTEGRAL VALUE CALCULATION SECTION
106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
1301 MAXIMUM PEAK VALUE DETECTION SECTION
15 1302 POSITIVE DIRECTION POSITION DETECTION SECTION
1303 NEGATIVE DIRECTION POSITION DETECTION SECTION
1304 INTERVAL CALCULATION SECTION
1305 INTERVAL DETERMINATION SECTION
1306 THRESHOLD VALUE CHANGING SECTION
20 1307 NEGATIVE DIRECTION POSITION STORAGE SECTION
1308 DEMODULATION TIMING DETECTION SECTION
1310 (DEMODULATION TIMING DETECTION UNIT)

[FIG.19]

25 1600 SYNCHRONIZATION TRACKING APPARATUS
102 RADIO RECEIVING SECTION
103 REPLICA GENERATION SECTION
1610 DELAY PROFILE GENERATION SECTION

1611 CORRELATION VALUE GENERATION SECTION
1612 THINNING-OUT INTERVAL SETTING SECTION
1613 IN-PHASE ADDITION SECTION
105 INTEGRAL VALUE CALCULATION SECTION
5 106 MAXIMUM INTEGRAL VALUE DETECTION SECTION
1301 MAXIMUM PEAK VALUE DETECTION SECTION
1302 POSITIVE DIRECTION POSITION DETECTION SECTION
1303 NEGATIVE DIRECTION POSITION DETECTION SECTION
1304 INTERVAL CALCULATION SECTION
10 1305 INTERVAL DETERMINATION SECTION
1306 THRESHOLD VALUE CHANGING SECTION
1307 NEGATIVE DIRECTION POSITION STORAGE SECTION
1308 DEMODULATION TIMING DETECTION SECTION
1310 (DEMODULATION TIMING DETECTION UNIT)

1/18

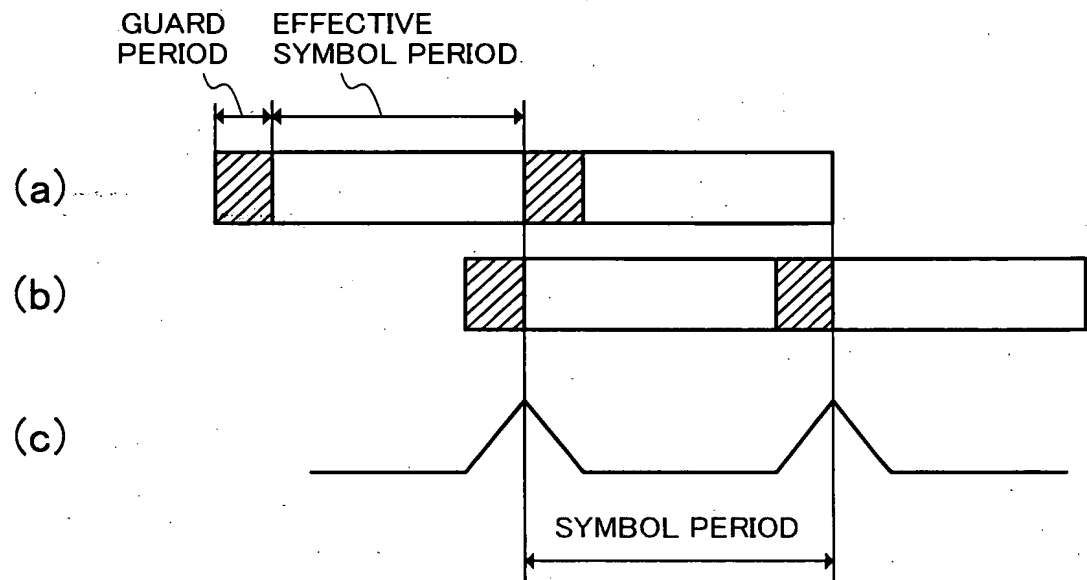


FIG. 1 PRIOR ART

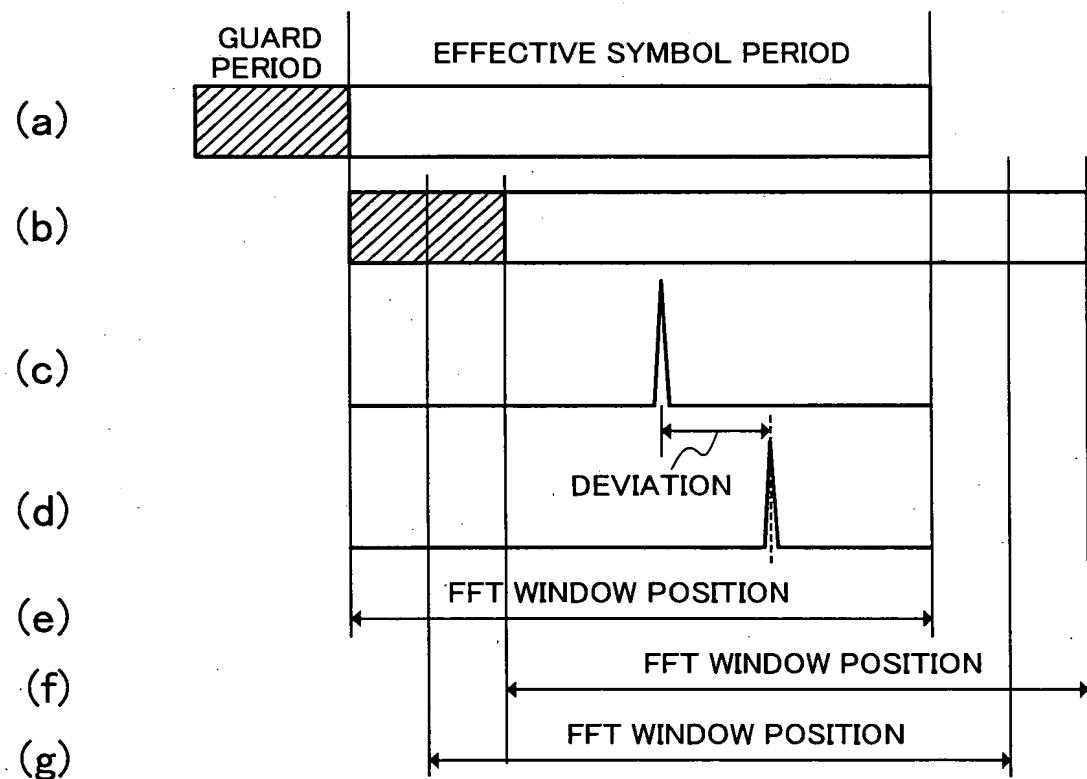


FIG. 2 PRIOR ART

2/18

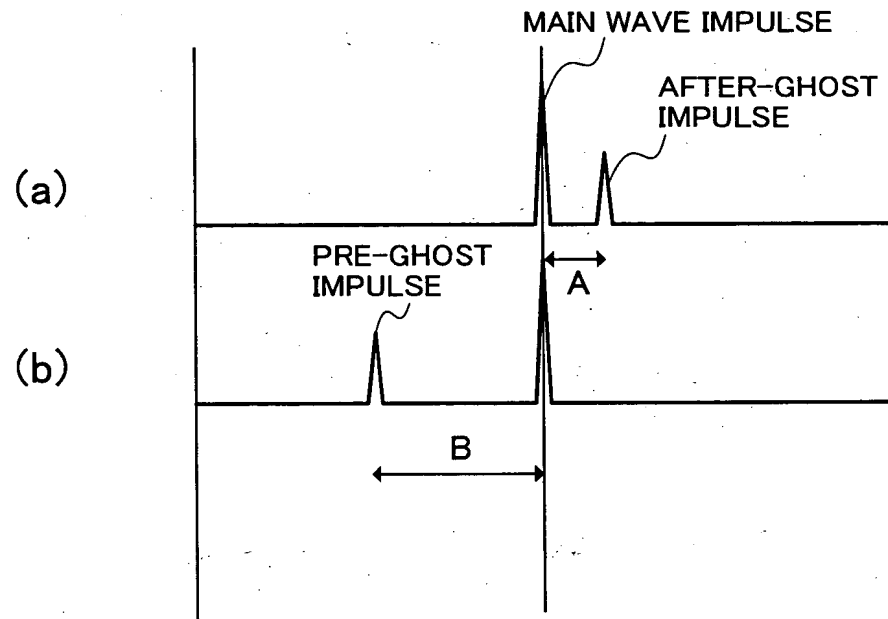


FIG.3 PRIOR ART

100 SYNCHRONIZATION TRACKING APPARATUS

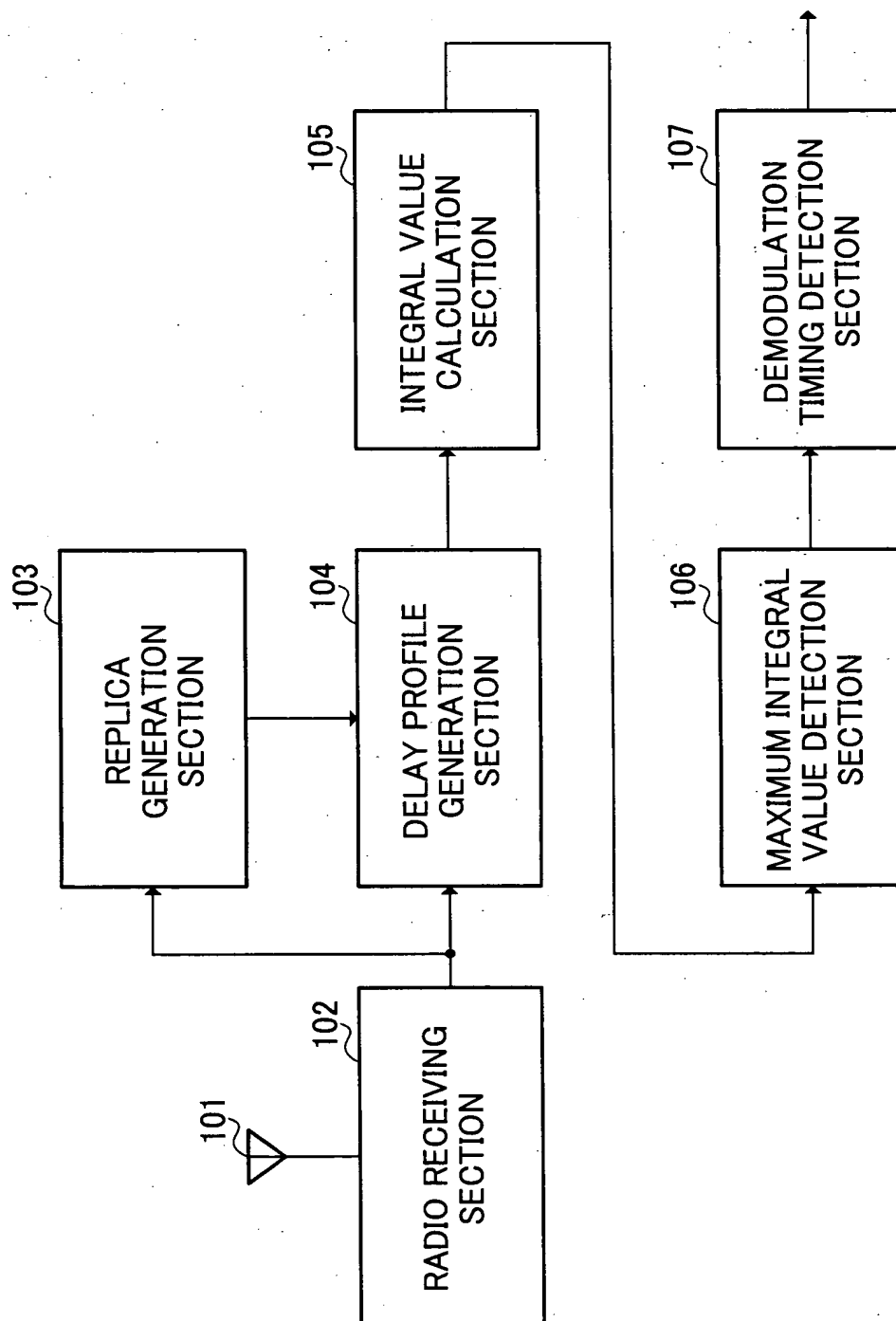


FIG.4

4/18

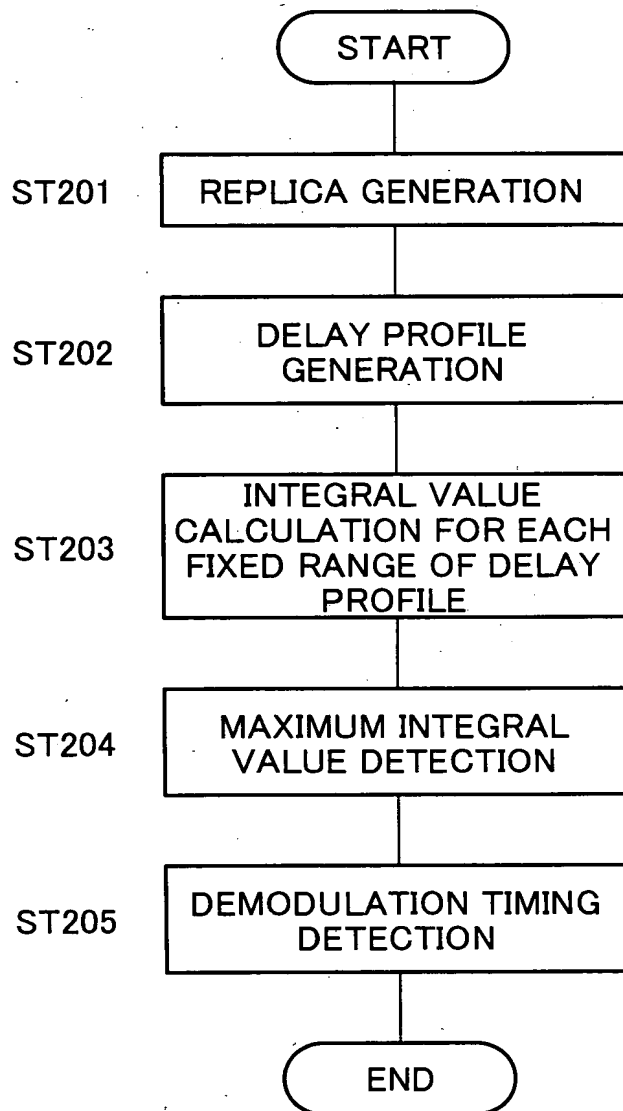


FIG.5

300 SYNCHRONIZATION TRACKING APPARATUS

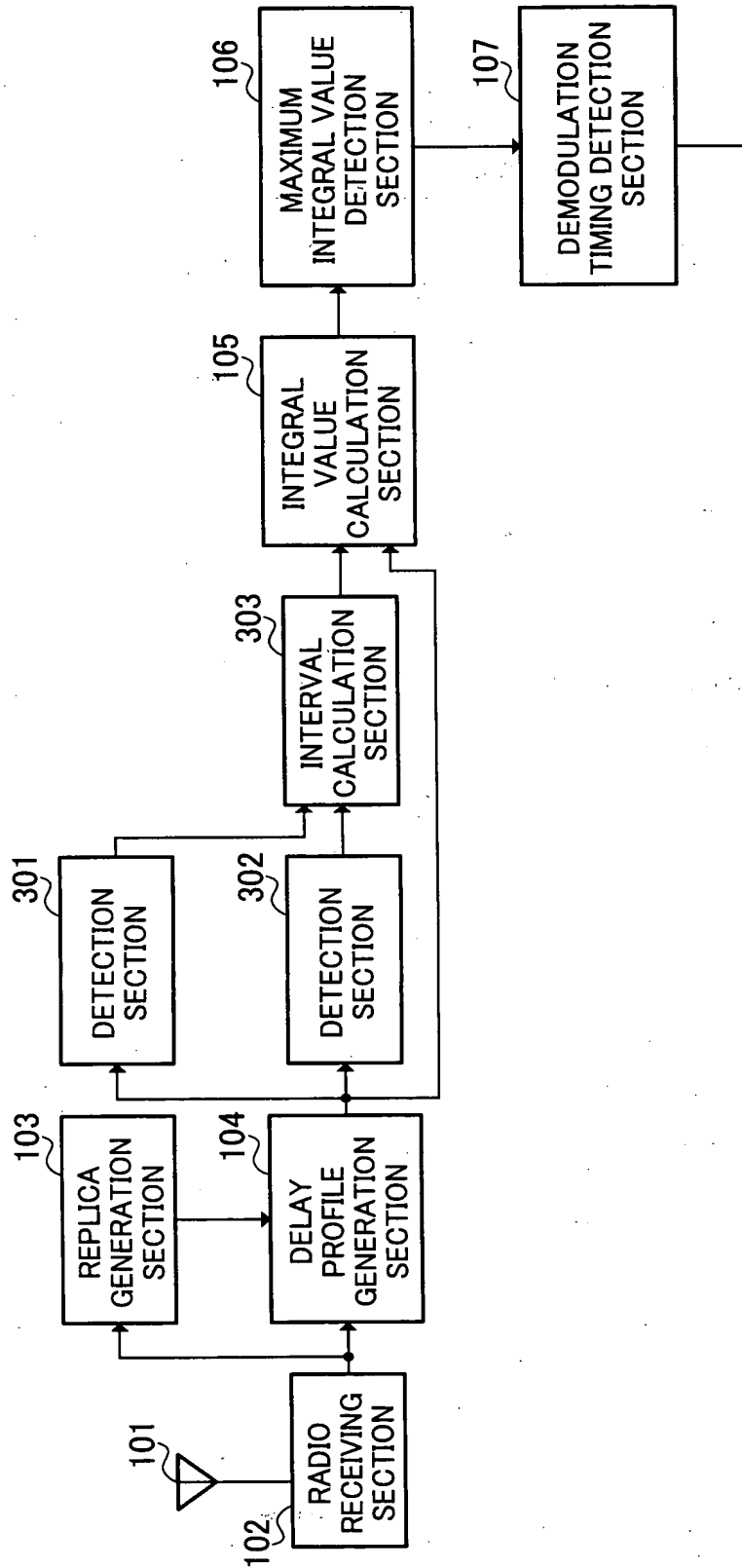


FIG.6

400 SYNCHRONIZATION TRACKING APPARATUS

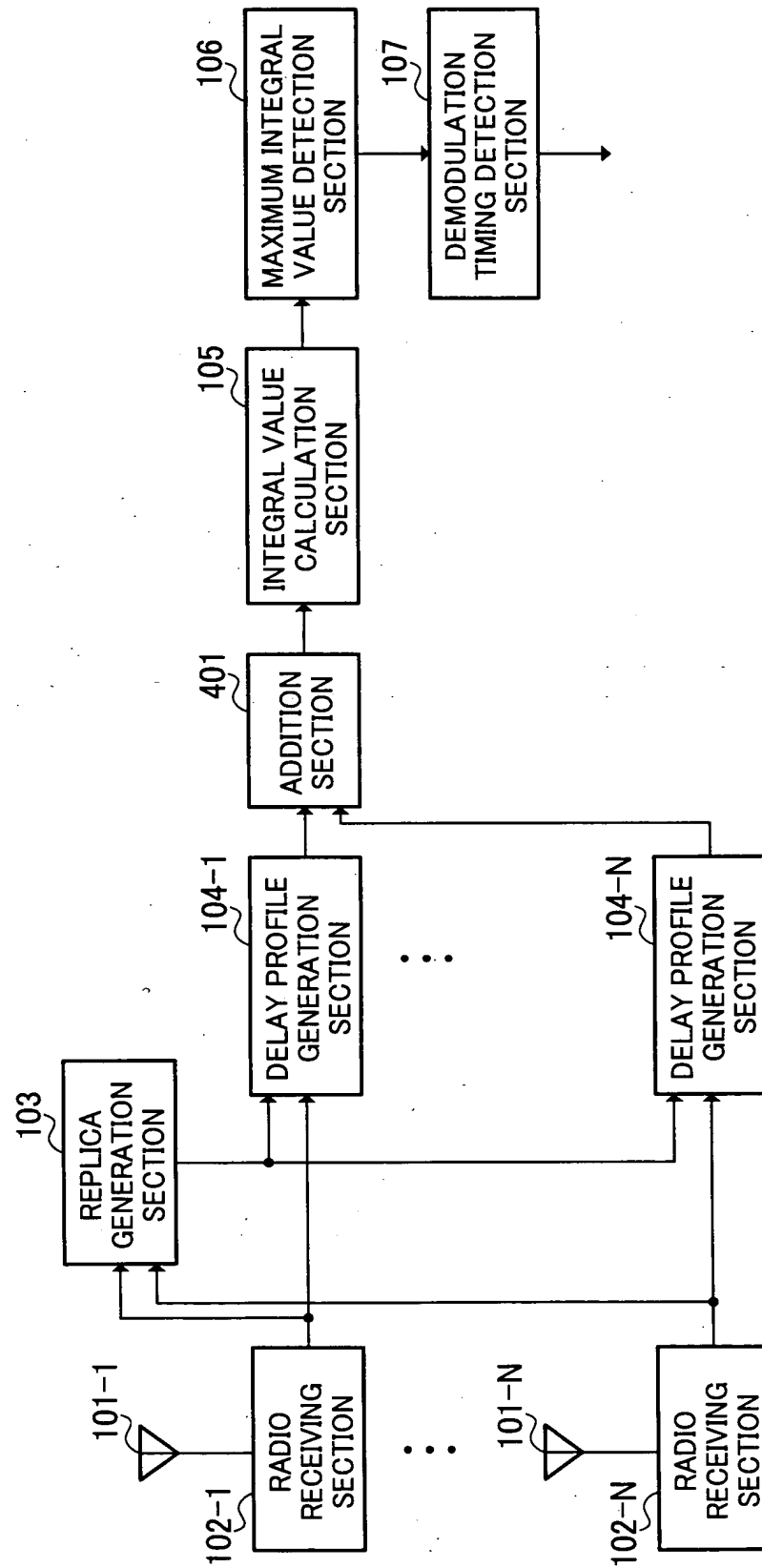


FIG.7

500 SYNCHRONIZATION TRACKING APPARATUS

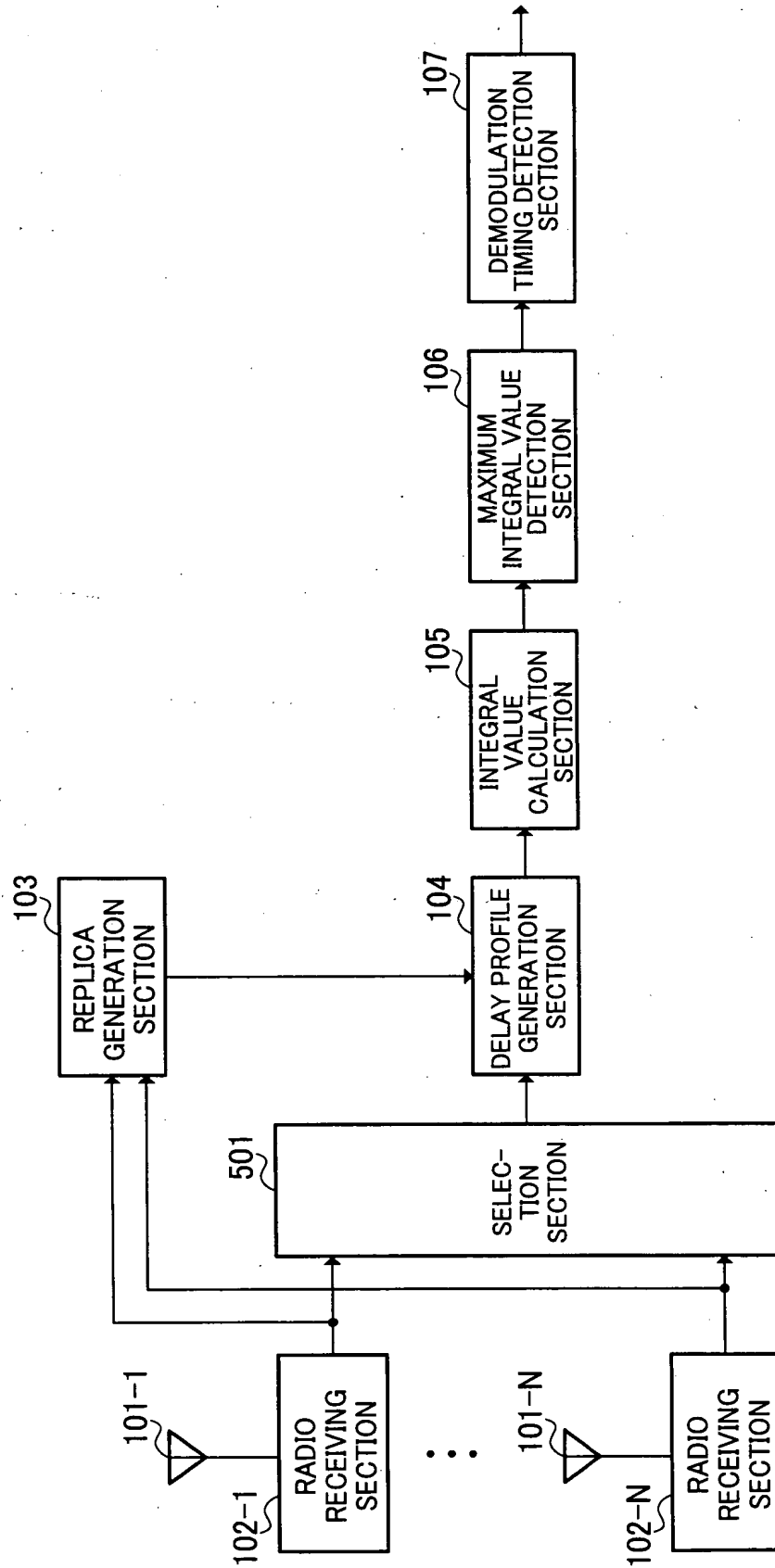


FIG.8

600 SYNCHRONIZATION TRACKING APPARATUS

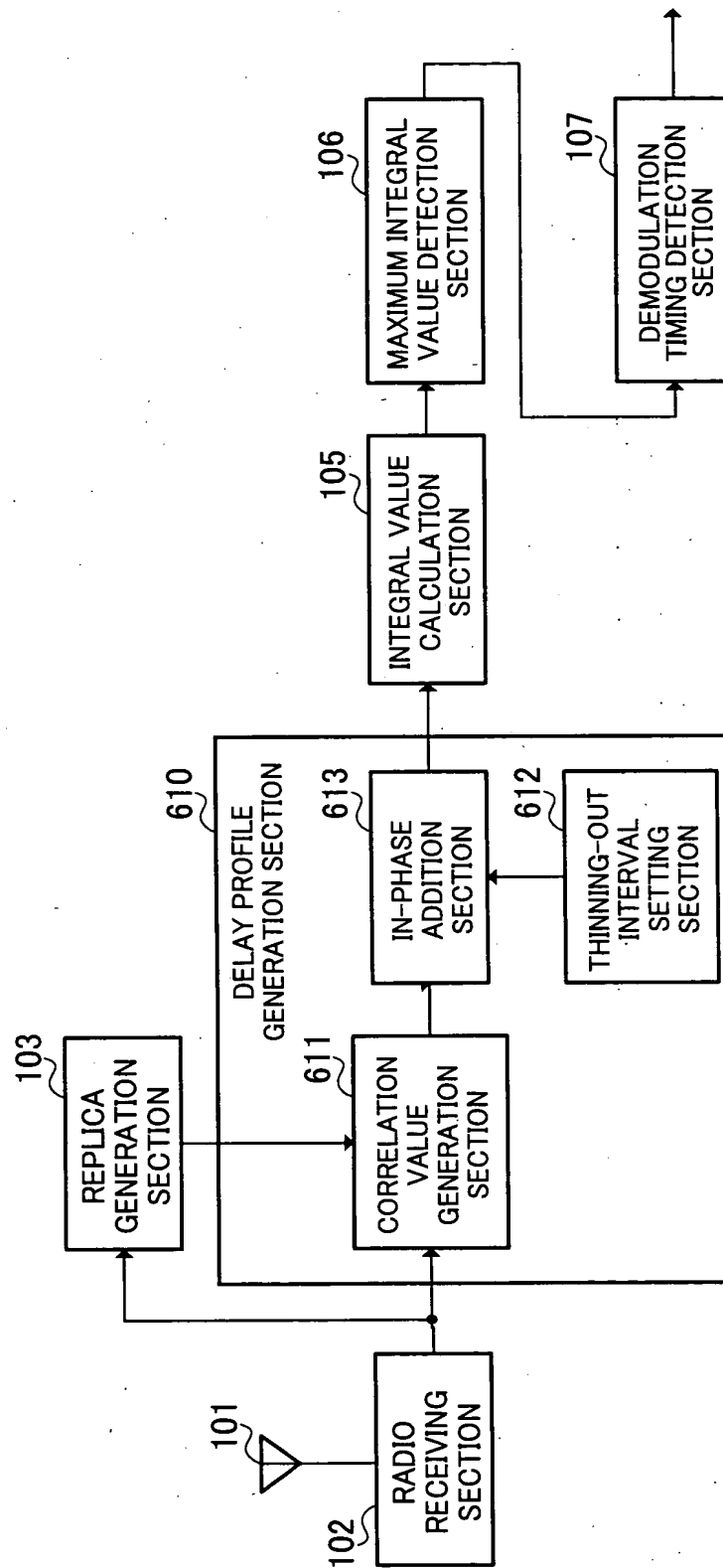


FIG.9

700 SYNCHRONIZATION TRACKING APPARATUS

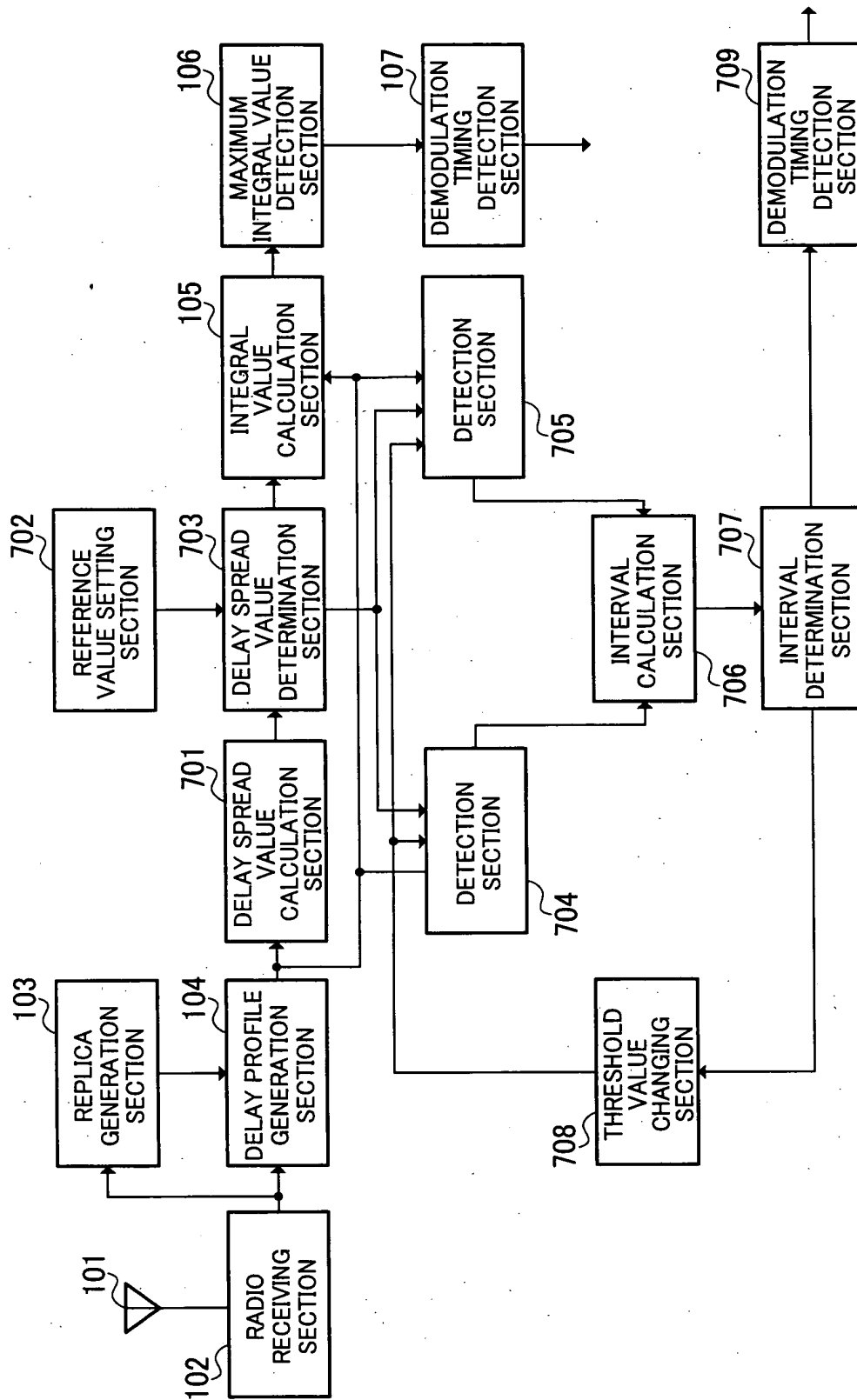


FIG.10

800 SYNCHRONIZATION TRACKING APPARATUS

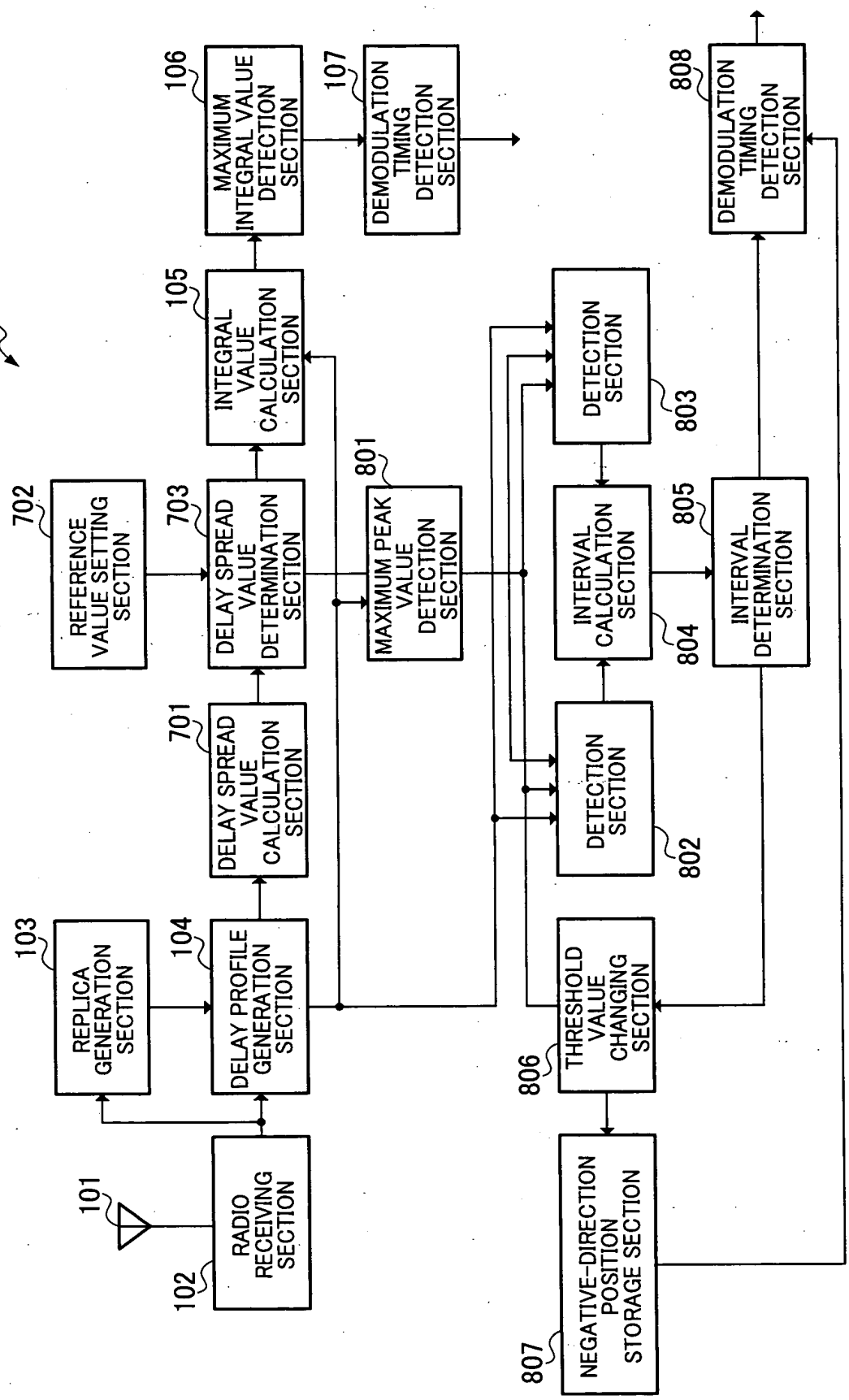


FIG.11

12/18

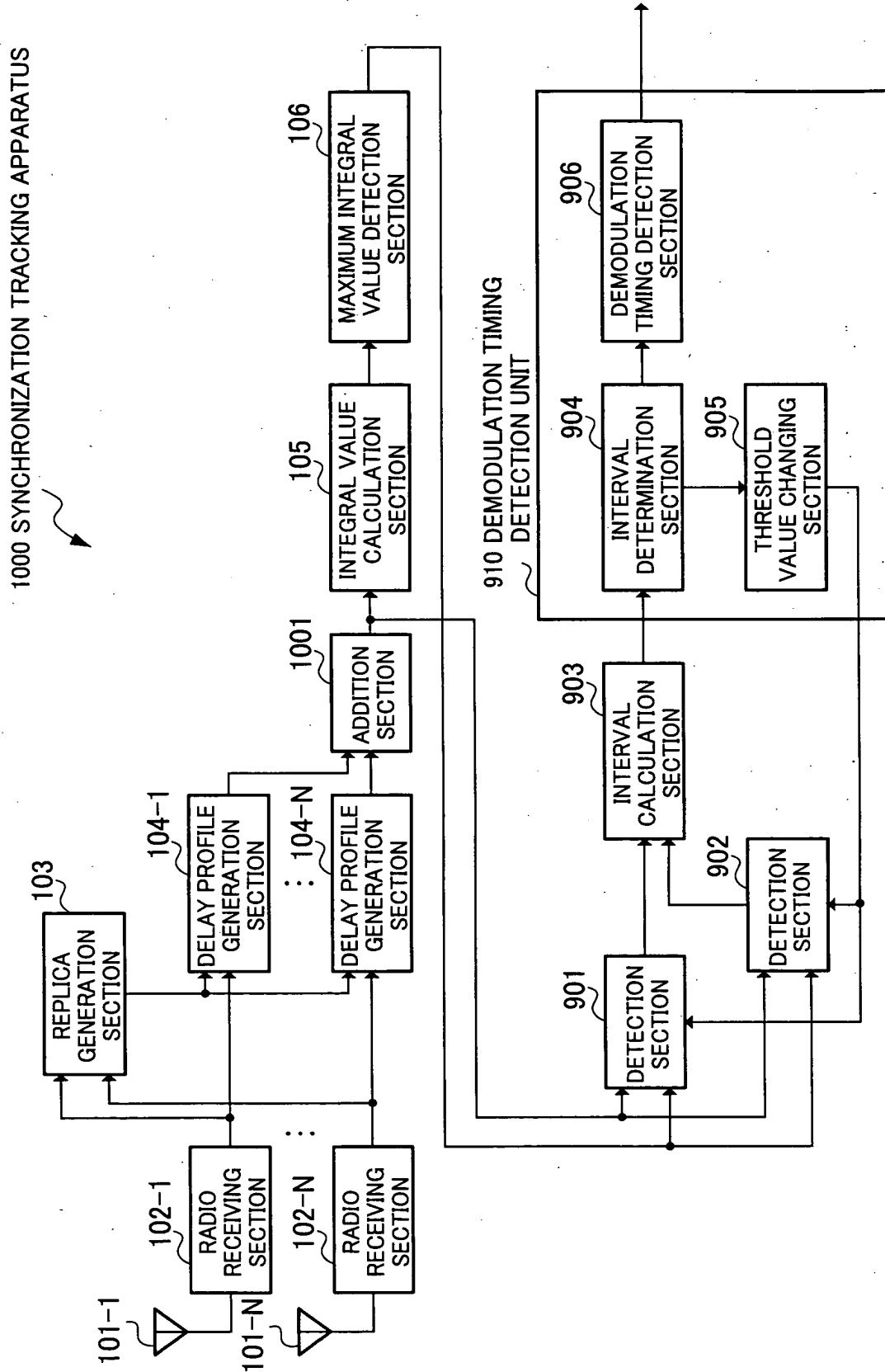


FIG.13

1100 SYNCHRONIZATION TRACKING APPARATUS

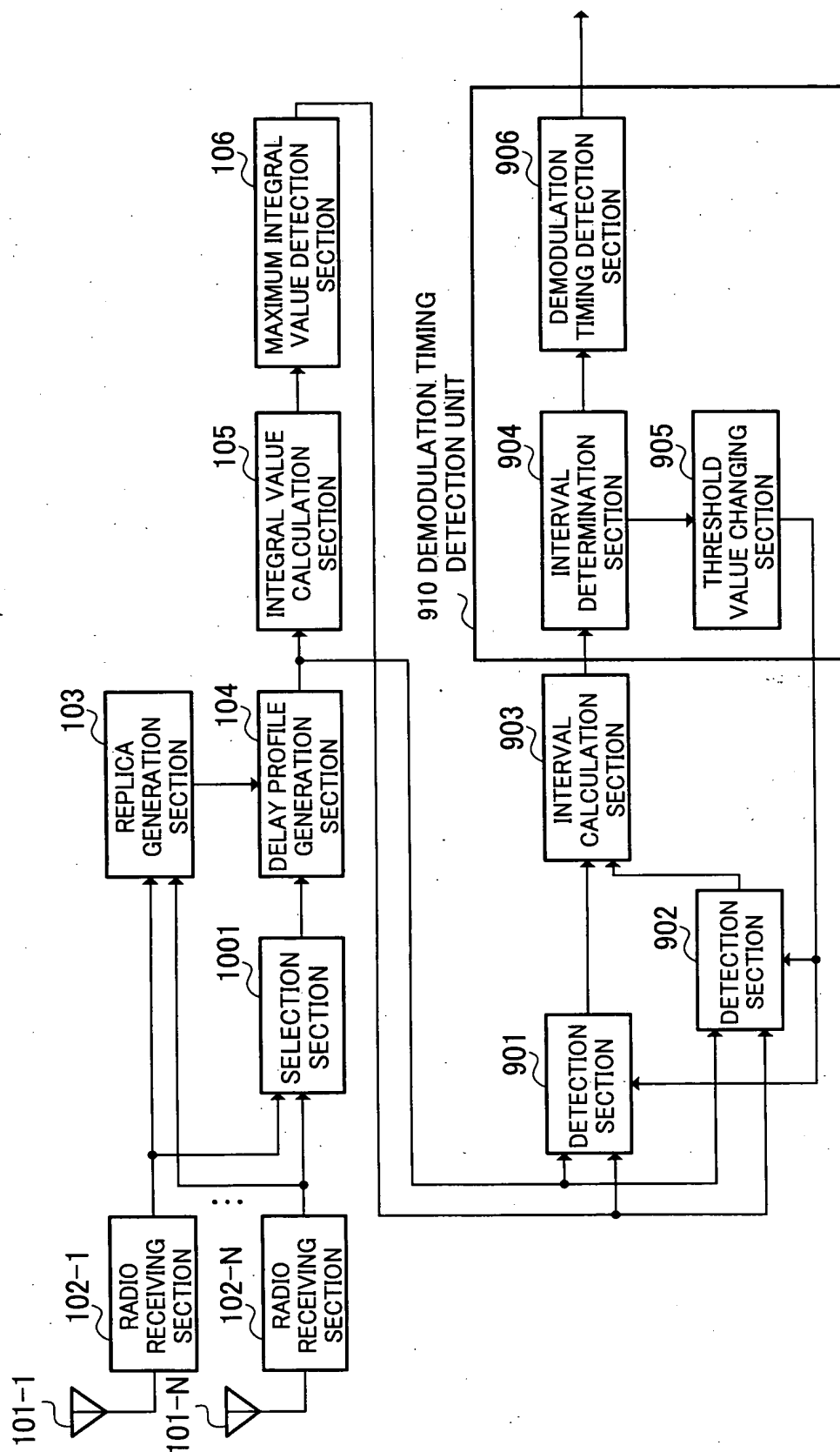


FIG.14

1200 SYNCHRONIZATION TRACKING APPARATUS

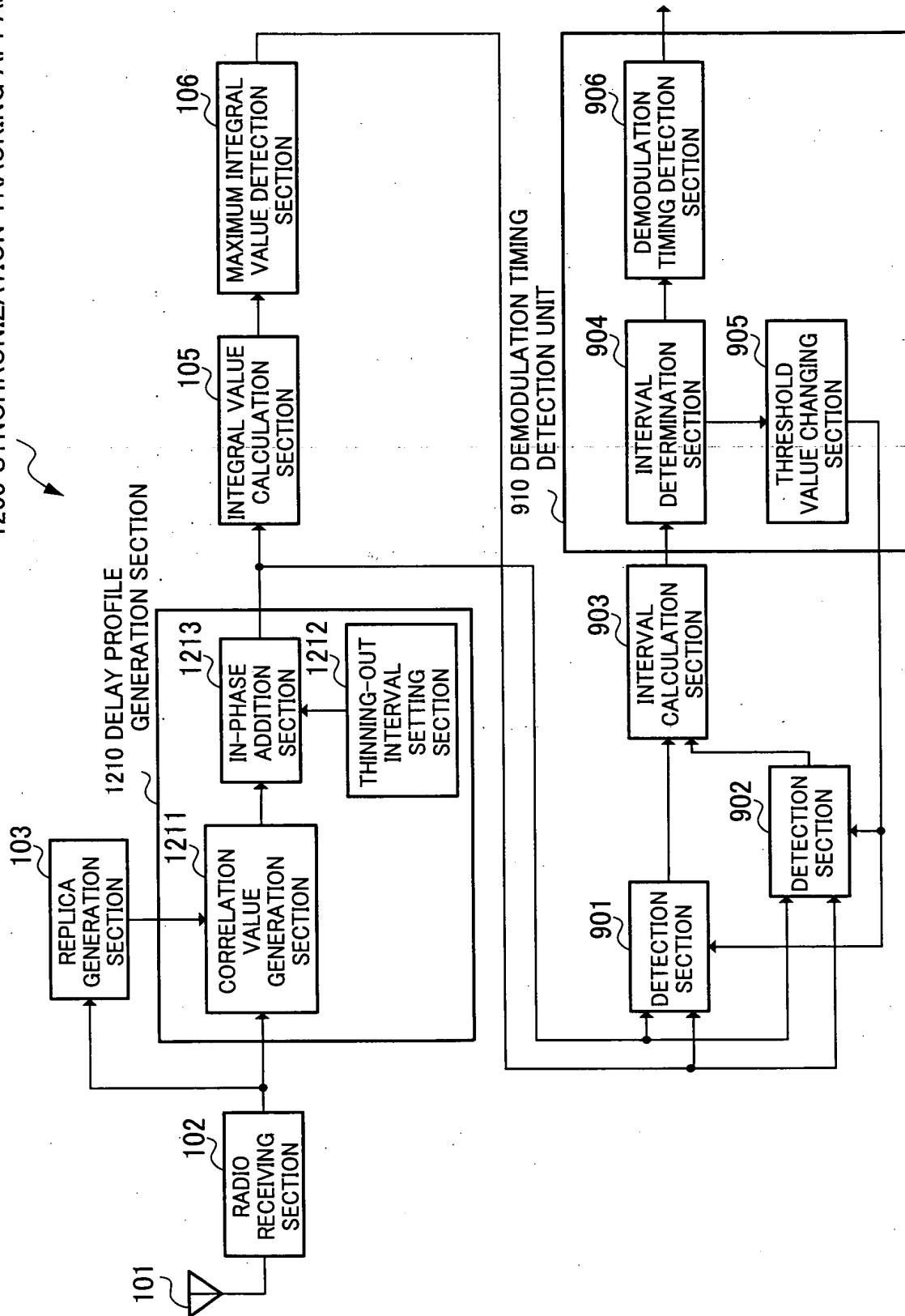


FIG.15

1300 SYNCHRONIZATION TRACKING APPARATUS

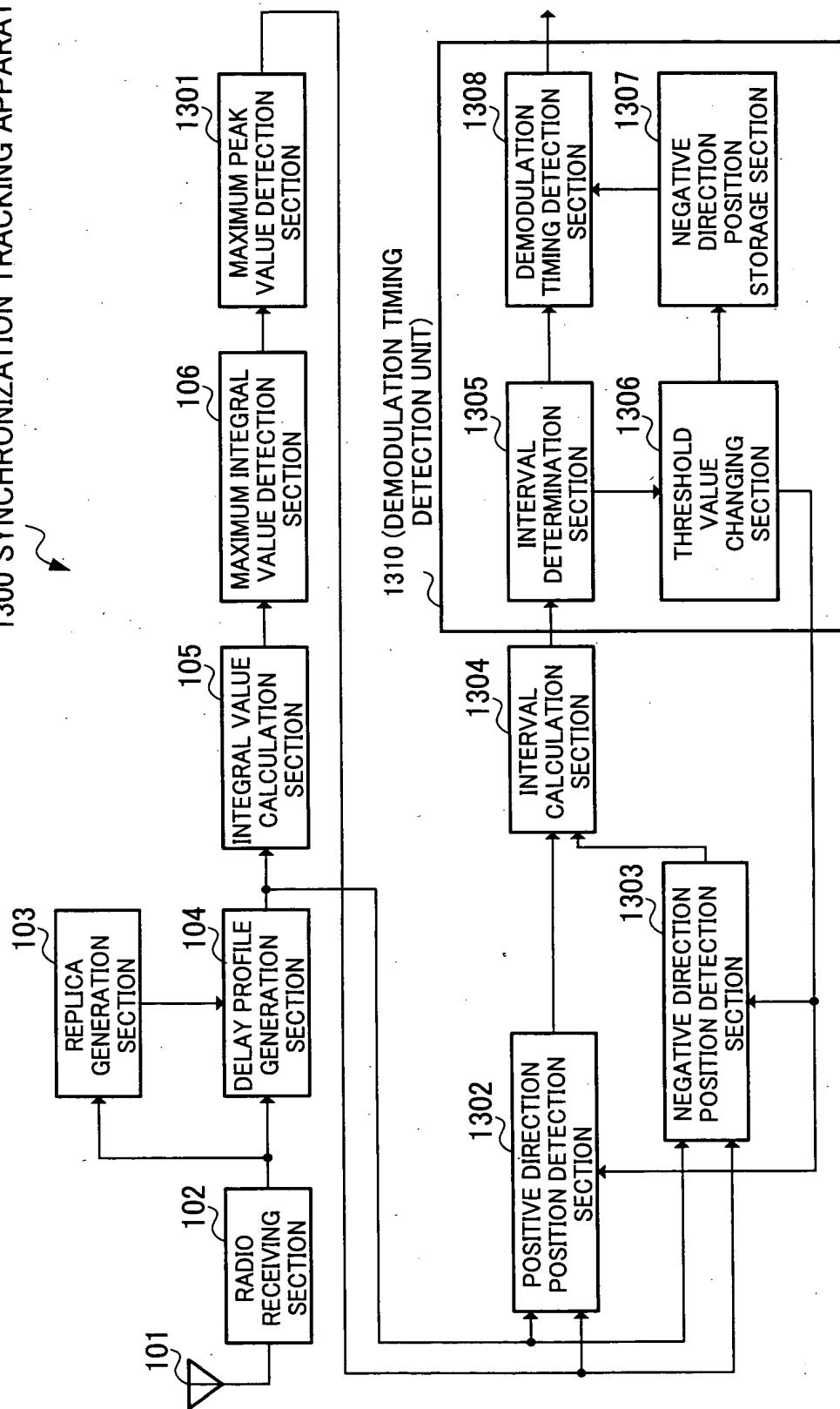


FIG.16

1400 SYNCHRONIZATION TRACKING APPARATUS

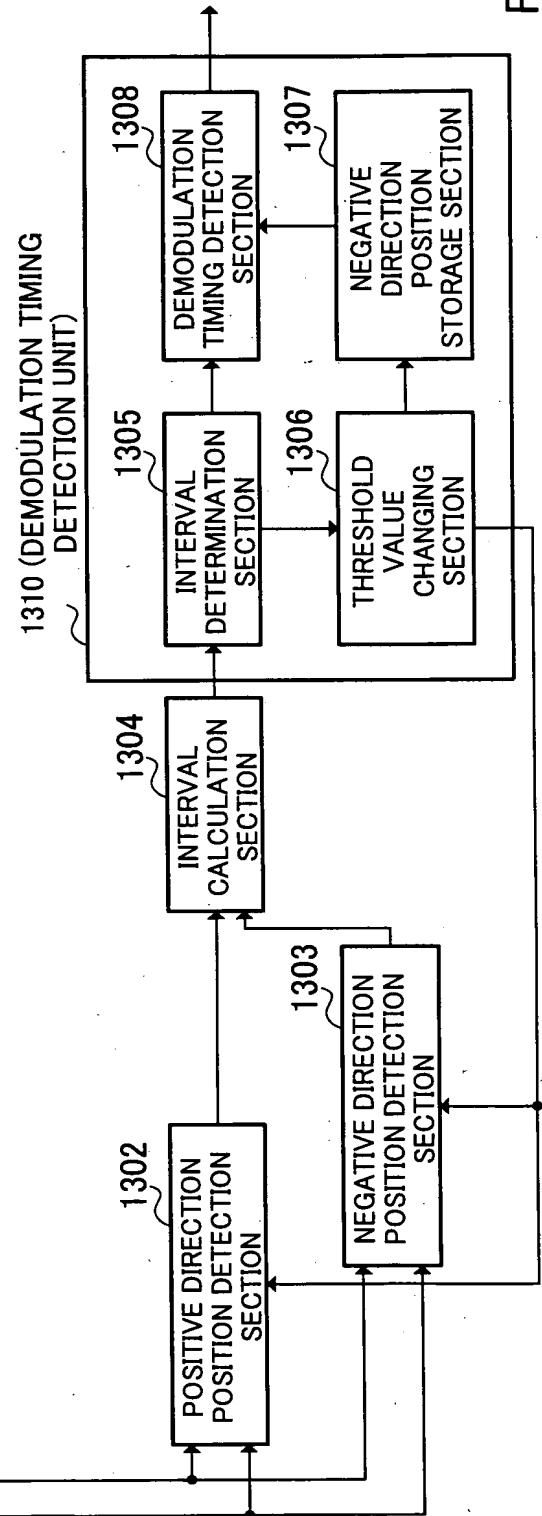
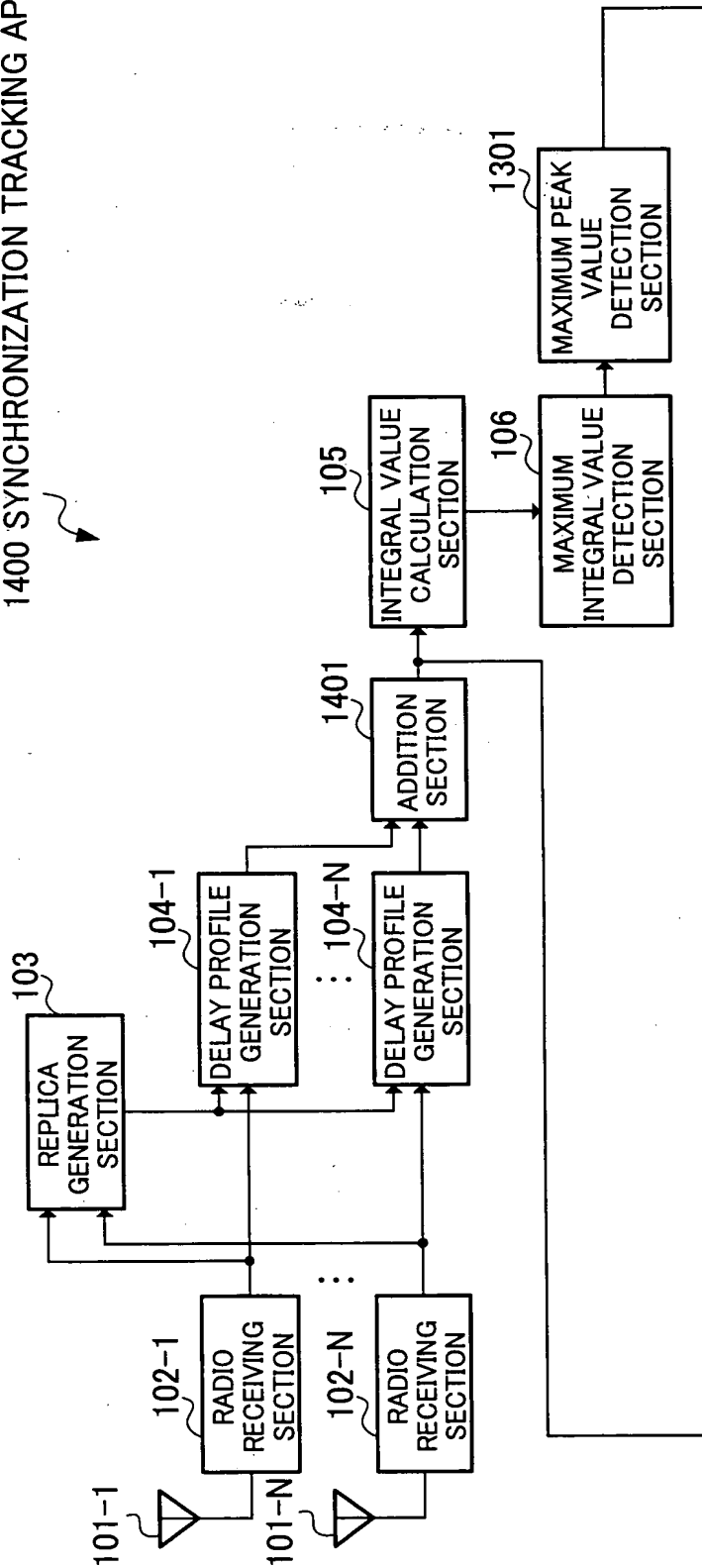


FIG.17

1500 SYNCHRONIZATION TRACKING APPARATUS

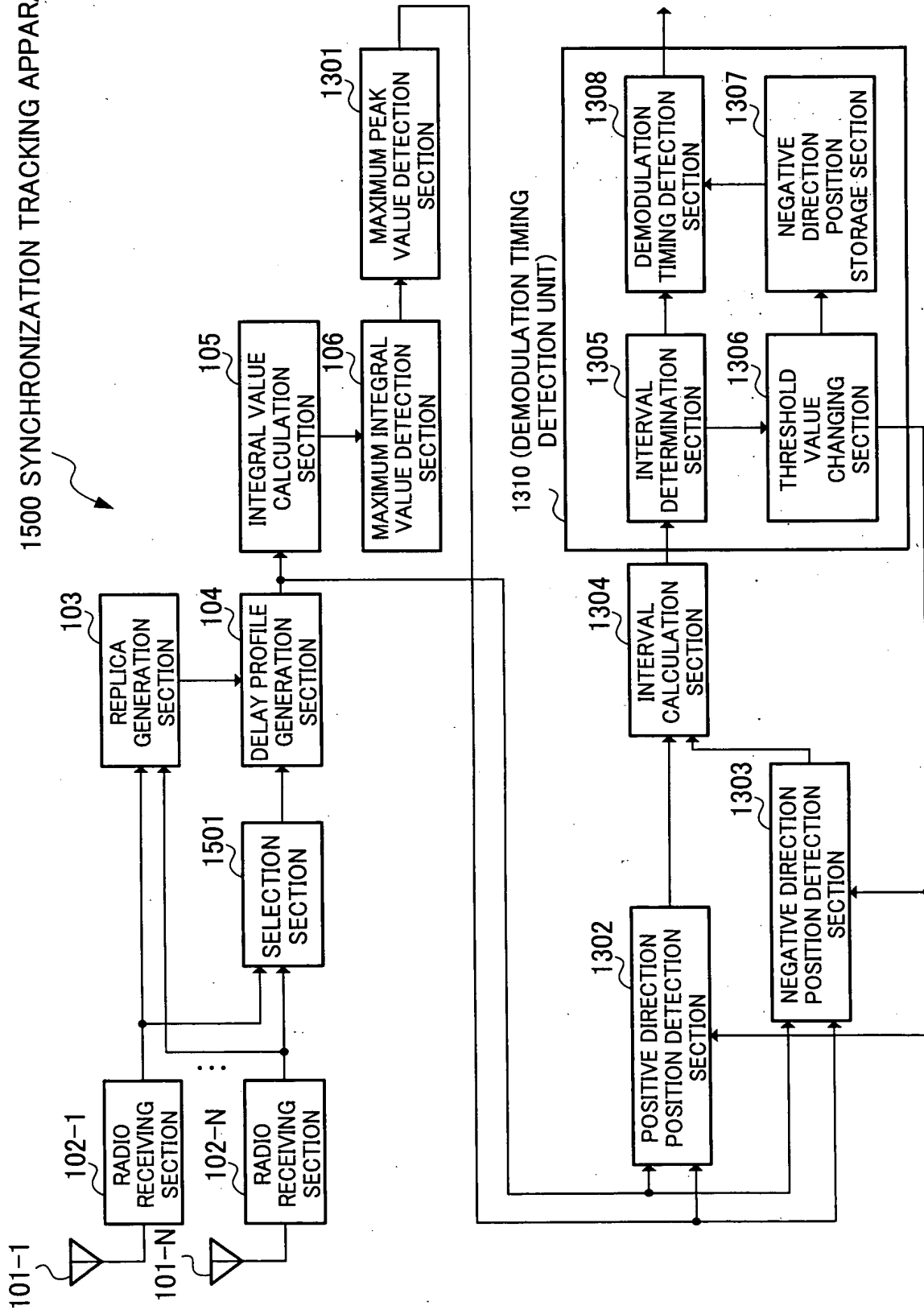


FIG.18

1600 SYNCHRONIZATION TRACKING APPARATUS

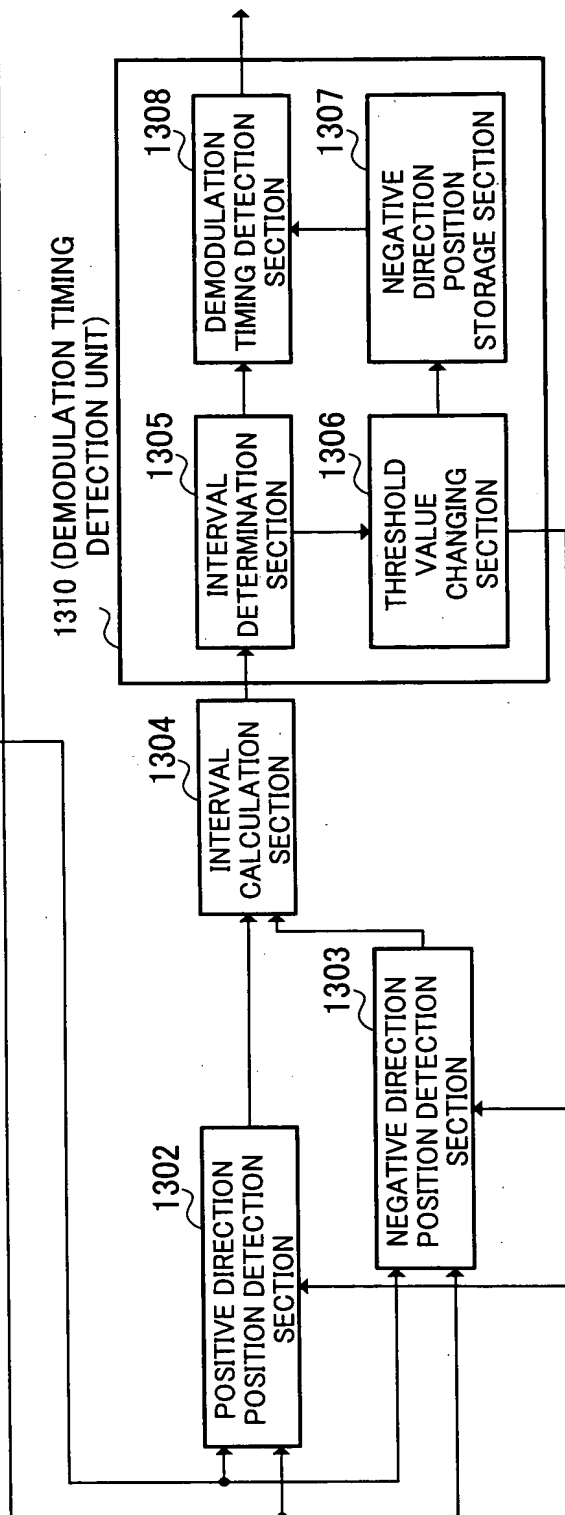
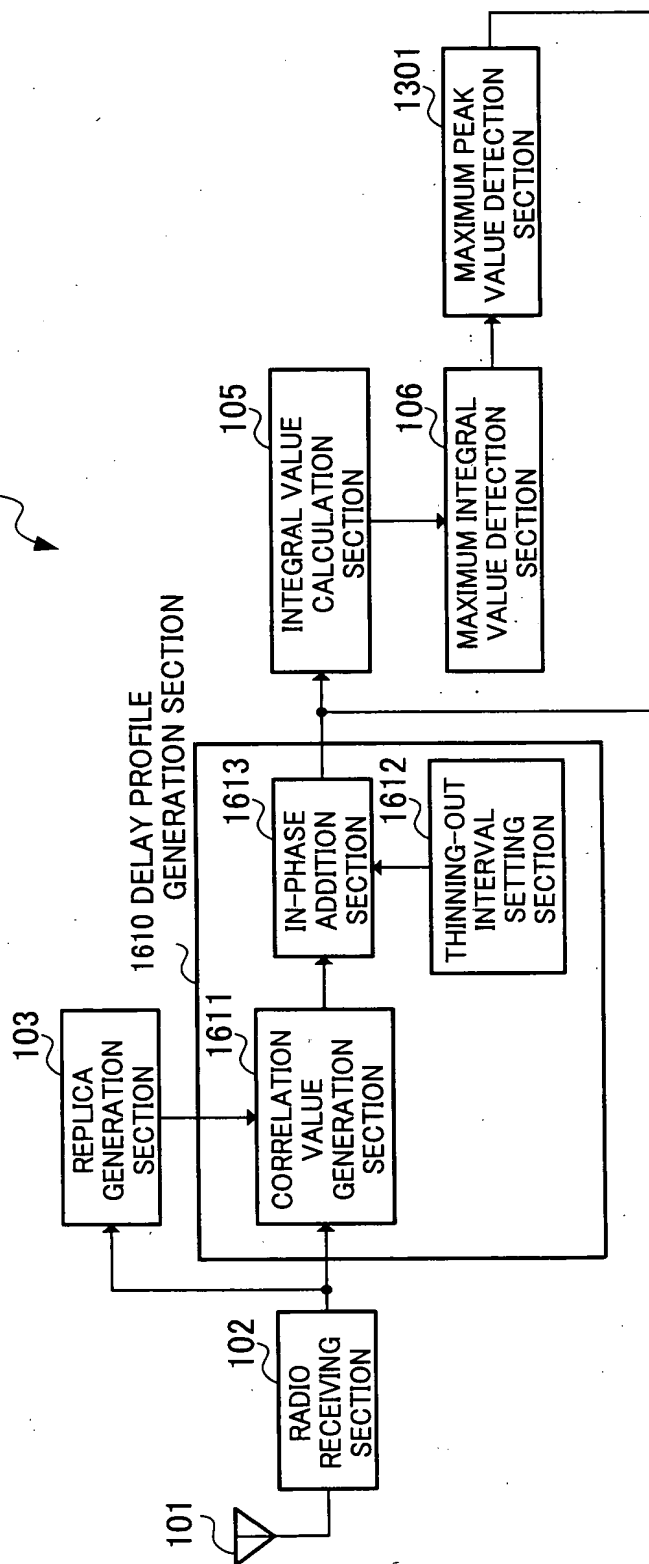


FIG.19